Comparison of Magnetic Properties of Magnetic Beads for Magnetic Separation

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Abstract. Three different magnetic beads consisting of Fe_3O_4 magnetic core, silica shell and organic ligand's shell of 3-Mercaptopropyl-trimethoxysilane, Phenyl-3-aminopropyltrimethoxysilane and Trimethoxysilyl-propyl methacrylate were prepared with the aim to increase the surface active centres for DNA/RNA magnetic separation. The magnetic properties of prepared samples in powder form were studied by ZFC/FC magnetization and by field dependence of magnetization using SQUID magnetometry. The magnetic moment and the particles size distribution were calculated from experimental data by fitting of Langevin function. The properties of samples containing Trimethoxysilyl-propyl methacrylate in liquid form was compared with those measured on a commercially purchased kit designed for RT-PCR diagnostics. We have found that a detailed study of magnetic parameters serves as a very sensitive tool for the design of magnetic beads for PCR diagnostics, despite the fact that they contain a diamagnetic surface layer.